Statement of

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Chairman Pryor, Chairman Akaka, Senator Voinovich, Senator Sununu, and members of the subcommittees. I appreciate the opportunity to participate in this hearing concerning preparedness for a radiological incident. My name is Wayne Tripp, and I am the Program Manager for the Domestic Preparedness Equipment Technical Assistance Program (DPETAP), Homeland Security and Emergency Management Services for General Physics Corporation.

I have been involved in emergency management and response since 1975, and have at various times served as a fire fighter, emergency medical technician, hazardous materials responder, planner, trainer and exercise manager. I have been with General Physics Corporation (GP) since August, 2001, providing planning, training and exercise support for non-governmental organizations, state, local and Federal agencies.

DPETAP was started in 1998, and is a partnership between the Pine Bluff Arsenal (PBA), the U.S. Department of Homeland Security (DHS) and operated by GP. DPETAP is a nationwide technical assistance equipment training program on the capabilities and limitations of chemical, biological, radiological, nuclear, and explosive (CBRNE) detection, protection, decontamination and response equipment for the Nation's first responders and first receivers. DPETAP is a comprehensive WMD and all hazards program focused on providing needed equipment technical assistance to state and local emergency response agencies and organizations in the areas of maintenance, training, and technical information support. Target jurisdictions are those that receive equipment grant funds from DHS. GP provides on-site assistance through mobile technical assistance teams based at PBA. Services offered by DPETAP are provided as requested, and include:

- Analysis of current CBRNE detection, protection, and response equipment as well as recommendations for technologies to enhance the current response posture of the jurisdiction or state
- Training on the capabilities, limitations and use of equipment
- Training on routine equipment maintenance and calibration
- Training in procedures for mass casualty personnel decontamination and hospital mass casualty patient decontamination

- Training in procedures for donning, doffing, working, and communicating in all threats/hazards-related personal protective equipment (PPE)
- Practical and tabletop exercises to support training and evaluation

DPETAP supports four of the seven National Preparedness goal priorities and 20 of the 36 capabilities on the Target Capabilities List.

I have been asked to discuss the types of radiological detection equipment available, the proficiency of responders, and community and hospital decontamination programs that could help prevent the spread of radiological materials in the aftermath of a Radiological Dispersion Device (RDD) attack. I will focus my discussion on what we have observed during our more than 7 years of providing DPETAP Technical Assistance to more than 82,000 responders in 45 states, two territories and the District of Columbia.

Before I discuss the current radiological detection technologies, I would like to provide a very brief overview of radiation and radiation detection. Because radiation is not detectable to our senses, we need to have some method to determine its presence, and the risk that it represents.

The radiation risk from a terrorist use of a Radiation Dispersal Device (RDD) is directly correlated to the type, quality, and quantity of materials used. The immediate harm is due to the explosive device used to disperse the substance. The harm from the radiation is generally delayed. The ionizing energy that is released by a radioactive material takes the form of particles or waves. These radioactive particles and waves are named from the Greek alphabet: alpha, beta, and gamma. Ionizing radiation changes the physical state of the atoms that it strikes. This causes them to become electrically charged or "ionized."

- Alpha radiation is made of heavy, positively charged particles. Because alpha particles are big by atomic standards, they can be stopped by the outer layer of human skin or an ordinary sheet of paper.
- Beta radiation is made of electrons. Because beta particles are much smaller than alpha particles, they are more penetrating. Beta particles can pass through one to two centimeters of water or into human skin. But beta radiation can be stopped by a sheet of aluminum that's just a few millimeters thick.

- Gamma, as well as x-rays are also types of ionizing radiation. Unlike alpha and beta, gamma and x-rays are merely waves of energy that are released when an atom decays. Gamma and x-rays can pass right through the body, but they are almost completely absorbed by lead.

Although alpha radiation can be stopped by human skin, materials that emit alpha radiation can enter the body through air, food, and water, or open wounds. Once inside the body, alpha as well as beta, gamma and x-ray radiation can affect internal tissues. Detectors have been developed to identify the presence of these types of ionizing radiation.

Since the discovery of x-rays by Wilhelm Röntgen in 1895, radiation detectors have experienced a constant evolution. The phosphorescent screen where Roentgen observed x-ray was the first real-time detector and the precursor to the scintillation crystal detectors still in use today.

The gas filled radiation detector was created by Hans Geiger while working with Ernest Rutherford in 1908. This device was later refined by Geiger and Wilhelm Mueller and is sometimes called simply a Geiger counter or a G-M counter which is the most commonly used portable radiation instrument. The main drawback of the G-M counter is its inability to provide information on the energy of the radiation it detects – in other words, how penetrating the radiation is.

Most modern spectrometers depend on scintillation crystals or semiconductor radiation detectors. Scintillation crystals respond to radiation by emitting a flash of light proportional to the energy of the photon that is stopped in the crystal.

The most recent class of detector developed is the solid state detector. These detectors convert the incident photons directly into electrical pulses.

The instruments that are available today include handheld, backpack, wristwatch, and portal monitors – each using a variety of different technologies and used for different purposes. The best detector for a given application depends on several factors. There are currently 149 different radiation detectors listed on the Responder Knowledge Base, grouped into 5 categories:

Personal Radiation Detectors, used to alert an individual to the possible presence of radiation. These are generally most effective at detecting gamma radiation.

Portable Survey Meters, used to identify areas of contamination, type of radiation, as well as the intensity of the radiation. Portable survey meters, depending upon the device and probes included, can detect many types of radiation.

Portable Radionuclide Identifiers, used to determine the specific substance present. These identify the specific isotope that is emitting the radiation.

Dosimeters, used to determine the specific level of exposure over time for an individual; and

Portal Monitors, which are used to identify the presence and, in some cases, type of radiation at a fixed location such as a doorway or port of entry.

The majority of detectors we have observed in the field tend to be the portable survey meters and an increasing number of personal radiation detectors such as the pager. In the following section on responder proficiency, I will focus on what we have observed via DPETAP and Homeland Defense Equipment Reuse (HDER) Program technical assistance visits.

The Homeland Defense Equipment Reuse (HDER) Program was a joint effort among the Department of Homeland Security (DHS), the Department of Energy (DOE), the Department of the Navy (USN), the Health Physics Society (HPS) and Helping Our Own (HOO) to provide excess radiological detection instrumentation and other equipment, training and long-term technical support to emergency responder agencies nationwide. This equipment was rehabilitated and provided at NO COST to the recipient. On-site training on the use of the equipment was provided to emergency responders through a partnership between the Domestic Preparedness Equipment Technical Assistance Program (DPETAP) and DOE's Transportation Emergency Preparedness Program (TEPP). HDER has been integrated into DPETAP.

As the training partner for HDER, DPETAP personnel provided training to nearly 1,000 responders from 65 different agencies during 2004 and 2005. DPETAP has provided radiation related training, including the HDER program, to more than 15,000 first responders and first receivers since 2000. The vast majority of our participants (74%) are from the fire service, with law enforcement the second most frequent, although they are only about 6% of our total. Firefighters, by nature of their responsibility in most areas for operating in hazardous environments, including hazardous materials response teams, tend to have the most equipment,

particularly in portable survey detectors, while law enforcement tends to have more of the personal detectors such as the pagers. The quality of the detector varies widely, as does the familiarity. Areas where there is a pre-existing radiation risk, such as those in the planning zones for nuclear power plants, tend to have more equipment and a regular training and practice program, while those in more suburban and rural communities have less equipment, frequently older and not utilized often. An additional issue is the maintenance and upkeep. We have run across jurisdictions where the detectors had not been maintained, and the detectors (which need to be recalibrated for accuracy on a regular basis) were so far out of calibration as to be unusable to the responders.

One of the key components to protection following any incident that has the potential to contaminate people is the use of appropriate decontamination methods.

Decontamination is the process of removing a substance from an individual or item. Ideally, this would occur very near to the incident site. Historically, we know that many injured will self-evacuate to a hospital for treatment – they won't necessarily wait for the arrival of an ambulance. If the hospitals are not aware of the potential radiation risk on the arriving patients, they may not establish a decontamination system in time to prevent the spread of contamination into the hospital. It is much easier to remove contamination from the individual patient than it is to remove the contamination from the facility.

DPETAP has provided decontamination training more than 6,500 responders and hospital personnel from 443 agencies. This training provides them with hands-on practice utilizing their decontamination, equipment, procedures and plans to decontaminate victims from a chemical, radiological or biological incident. We have found that this is a critical training need for hospitals across the country, which are likely to be receiving contaminated patients. The confidence that the participants gain is important to their ability to respond appropriately should the need arise.

The training provided on decontamination and the operation, maintenance and use of detection technologies is only one component of proficiency. The agency personnel must also be working under an appropriate plan and set of procedures that define when to use the detectors and what to do if there is radiation detected. Plans, procedures, and training are best validated using

exercises. An effective exercise program aids the responders and their leadership in better understanding deployment, information management, and decision making in response to an emergency. Each exercise must be evaluated on an honest basis, with an after action report and improvement plan developed, implemented, and then tracked, in order to ensure that preparedness is moving forward. An effective after action report and improvement plan is one that identifies areas for improvement based on specific observations, recommendations, and implementing actions that are based on solid guidance or procedures.

The training provided by DPETAP is only one component to the overall preparedness of a responder. DPETAP supports the National Priorities of Expanding Regional Collaboration, Strengthening CBRNE Detection, Response, and Decontamination capabilities, and Strengthening Planning and Citizen Preparedness. We also aid jurisdictions in improving their readiness in several of the Target Capabilities, including CBRNE Detection, WMD/Hazardous Materials Response and Decontamination, and Planning.

SUMMARY

Not all explosions, fortunately, involve a radiological dispersion device. The response to the one that does, however, will likely start the same as any other report of an explosion. Unless some type of detector is used early, the radiological risk will not be identified, and people will not be protected or appropriately decontaminated until significant harm has already occurred. A continuous cycle of planning, training, and exercises, with an effective after action review and improvement plan implemented, is key to the long term enhancement of the front line personnel across the nation that would be called upon to respond to a terrorist incident.

Thank you for the opportunity to discuss these important national preparedness issues, and I would be pleased to answer any questions you may have.

U.S. Department of Homeland Security
Capabilities Directorate

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Capabilities Directorate

Domestic Preparedness Equipment Technical Assistance Program (DPETAP)

The Capabilities Directorate, within the Federal Emergency Management Agency (FEMA), has established the Domestic Preparedness Equipment Technical Assistance Program (DPETAP), a comprehensive, national technical assistance program for emergency responders. DPETAP was developed in partnership with the United States Army's Pine Bluff Arsenal, the Department of Defense's center of expertise for chemical and biological defensive equipment production and support.

DPETAP provides onsite technical assistance and training to assist emergency responders to better choose, operate, and maintain their chemical, biological, radiological, nuclear, and explosive (CBRNE) detection and response equipment. Technical Assistance (TA) is provided by DPETAP Mobile Technical Assistance Teams. These teams provide detailed technical information and hands-on equipment operation and maintenance training. DPETAP offers 45 courses and practical exercises that range from one to 24 hours (three eight-hour days) in length and include the following:

CBRNE Detection Technologies

Four courses are currently being offered. The three detection technologies courses were designed to train "apprentice through journeyman" from beginners having no prior knowledge of CBRNE-related technologies to the veteran responders in need of a refresher. The courses are:

1. **Introduction to WMD-related Hazardous Material** – Substances and Symptoms, provides a foundation for those unfamiliar with the "WMD Delta" of hazardous materials.

2. **WMD Detection Technologies** – primarily covers Weapons of Mass Destruction (WMD) detection technologies, types of detection equipment, their capabilities and limitations, and the CBRNE material that can be detected.

3. **Advanced WMD Detection Technologies** – an advanced version of the Intermediate WMD Detection Technologies course.

4. **Radiological Detection Survey Techniques** – provides extensive hands-on practical experience in laying out grids, conducting surveys, and data-logging. Additionally, for those utilizing Homeland Defense Equipment Reuse (HDER) Program equipment, this course addresses the various technologies employed in HDER Program detection and monitoring equipment, and can be presented in modular format.

Detection Equipment Operation and Maintenance (O&M) Courses

There are currently 29 hands-on courses that range from one to four hours in length and cover the capabilities, limitations, preoperation, operation, and preventive and corrective maintenance of CBRNE detection equipment.

WMD Mass Casualty Personnel Decontamination Training

This 24-hour course presents an in-depth study of the principles and procedures of mass casualty decontamination. Training involves high-energy tabletop exercises and practical applications to reinforce the objectives. Students undergo a rigorous analysis of a mass casualty incident from initial attack to clean up and reconstitution. Finally, students perform decontamination in four simulated personnel contamination situations: emergency responder, ambulatory victim, non-ambulatory victim, and pre-transport/ER.

For medical facilities, a one-day **Hospital Mass Casualty Patient Decontamination** training course incorporates many of the elements above, while focusing on the unique challenges of patient decontamination at a medical facility. A detailed fact sheet is available upon request.

WMD Personal Protective Equipment (PPE) Field Training

This 24-hour hands-on course covers the following topical modules:

- Introduction to WMD Personal Protective Equipment (PPE)
- Considerations for the selection of PPE
- Hot Area Operations
- PPE Practical Exercise (Note: This module consists of a 2-part, 12-hour practical exercise.)

Tabletop Practical Exercises

There are currently seven exercise scenarios. These one to two hour practical exercises present students with a variety of potential CBRNE event scenarios that require teams to evaluate the conditions; identify effective technologies detection equipment to be used in each situation; describe how they would use the equipment; and present their findings to the entire class. Hot washes and group discussions follow student team presentations.

Objectives

Enable emergency responders to gain a necessary level of expertise regarding CBRNE detection, monitoring, protection and remediation equipment.

Delivery Method

Mobile teams provide on-site assistance and training as well as training materials and equipment.

Target Audience

Members of all emergency response communities, including:

- Hazardous Materials (HAZMAT)
- Fire
- Law Enforcement
- Emergency Management
- Emergency Medical Services
- Environmental Health

Certificate

A certificate is issued for each course completed.

For further information and to obtain complete descriptions of all courses and practical exercises offered through DPETAP, as well as eligibility and schedule information, contact the Centralized Scheduling and Information Desk at **1-800-368-6498** or e-mail at **askcsid@dhs.gov**

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Hospital Mass Casualty Patient Decontamination (HMCPD)

The Capabilities Directorate, within the Federal Emergency Management Agency, has established the Domestic Preparedness Equipment Technical Assistance Program (DPETAP), a comprehensive, national technical assistance program for emergency responders. DPETAP was developed in partnership with the United States Army's Pine Bluff Arsenal, the Department of Defense's center of expertise for chemical and biological defensive equipment production and support.

DPETAP provides onsite HMCPD technical assistance and training utilizing the principles and procedures for mass casualty patient decontamination and the associated equipment in a hospital environment. Technical Assistance (TA) is provided by DPETAP Mobile Technical Assistance Teams. Training involves a high-energy drill exercise and practical application undergoing a rigorous analysis of many issues including hospital decontamination for WMD threats and the use of personal protective equipment in a simulated personnel contamination environment.

For further information and to obtain assistance with utilizing DSDP for your jurisdiction, region or state, contact the Centralized Scheduling and Information Desk at
1-800-368-6498 or e-mail at **askcsid@dhs.gov**

HMCPD Course Objective

To enable hospital emergency responders to gain a basic level of expertise regarding Mass Casualty Patient Decontamination and related equipment.

Course Description

This 8-hour Technical Assistance Visit presents a study of the principles and procedures for mass casualty patient decontamination and the associated equipment in a hospital environment. Training involves a high-energy drill exercise and practical application to reinforce the objectives. Students undergo a rigorous analysis of many issues including hospital decontamination for WMD threats to the use of personal protective equipment. Finally, students perform decontamination in a simulated personnel contamination environment. As in all DPETAP hands-on evolutions, safety will be stressed throughout the Technical Assistance Visit.

Class Size

Minimum: 15 Maximum: 25

Target Audience

- Members of Hospital Decontamination Teams
- Triage Personnel
- Emergency Department Personnel
- Hospital Support Staff
- Hospital Administrators